

INTERACTIVE DEVICE DESIGN

BUSINESS PLANS &
MODELS

NOV 28, 2016



Deadlines

- **TONIGHT:** One last component order.
Same spreadsheet as before.
- Monday 12/5, 10am: Project Poster
- Wednesday 12/7: Final Presentations
- Wednesday 12/14: Final Report and Video,
Team Reflection

Business Models and Business Plans

- **Business Model:** the rationale of how a company creates, delivers, and captures value.
- **Business Plan:** describe and communicate how a project can successfully be implemented – includes team, financial model, analysis of market and competition.
- Start with a model,
use it as basis for writing a plan.

Business Model Generation

WRITTEN BY

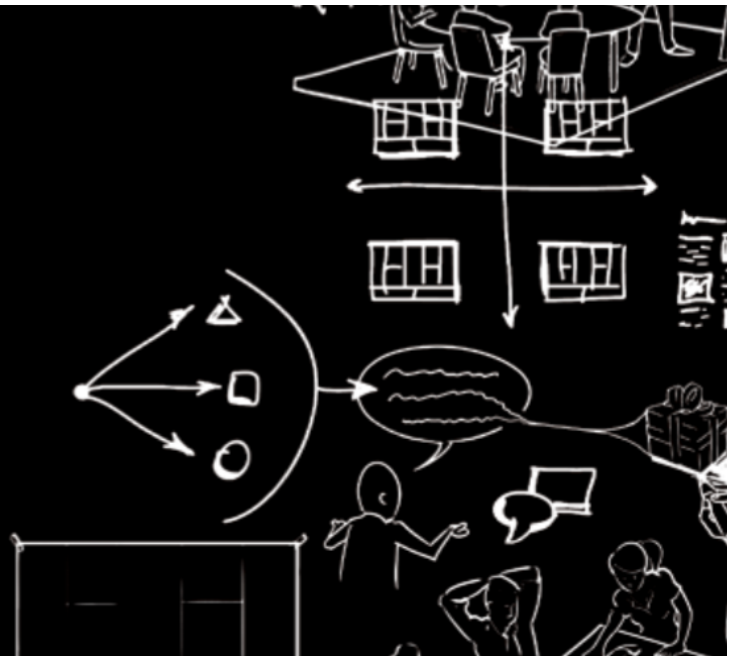
Alexander Osterwalder & Yves Pigneur

CO-CREATED BY

An amazing crowd of 470 practitioners from 45 countries

DESIGNED BY

Alan Smith, The Movement



Alex Osterwalder, Author

Dr. Osterwalder is an author, speaker, and adviser on the topic of business model innovation. His practical approach to designing innovative business models, developed together with Dr. Yves Pigneur, is practiced in multiple industries throughout the world by companies including 3M, Ericsson, Capgemini, Deloitte, Telenor, and many others. Previously he helped build and sell a strategic consulting firm, participated in the development of a Thailand-based global nonprofit organization combating HIV/AIDS and malaria, and did research at the University of Lausanne, Switzerland.



Yves Pigneur, Co-Author

Dr. Pigneur has been a Professor of Management Information Systems at the University of Lausanne since 1984, and has held visiting professorships at Georgia State University in Atlanta and at the University of British Columbia in Vancouver. He has served as the principal investigator for many research projects involving information system design, requirements engineering, information technology management, innovation, and e-business.



CS

1 Customer Segments

An organization serves one or several Customer Segments.



VP

2 Value Propositions

It seeks to solve customer problems and satisfy customer needs with value propositions.



CH

3 Channels

Value propositions are delivered to customers through communication, distribution, and sales Channels.



CR

4 Customer Relationships

Customer relationships are established and maintained with each Customer Segment.



R\$

5 Revenue Streams

Revenue streams result from value propositions successfully offered to customers.



KR

6 Key Resources

Key resources are the assets required to offer and deliver the previously described elements...



KA

7 Key Activities

...by performing a number of Key Activities.



KP

8 Key Partnerships

Some activities are outsourced and some resources are acquired outside the enterprise.












C\$

9 Cost Structure

The business model elements result in the cost structure.

The Business Model Canvas

<i>Key Partners</i> 	<i>Key Activities</i> 	<i>Value Proposition</i> 	<i>Customer Relationships</i> 	<i>Customer Segments</i> 
	<i>Key Resources</i> 		<i>Channels</i> 	
<i>Cost Structure</i> 			<i>Revenue Streams</i> 	



I. Customer Segments

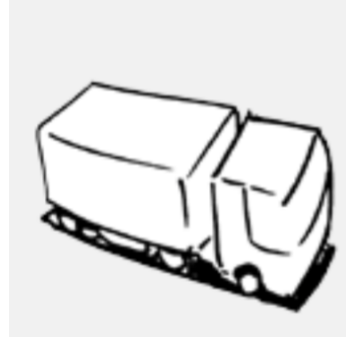
- Mass market (e.g., consumer electronics)
- Niche market (e.g., car part suppliers)
- Segmented (e.g., cars)
- Diversified (e.g., Amazon)
- Multi-sided markets (e.g., eBay, credit card cos)

2.Value Propositions



- Newness (no similar product)
- Performance (Gore Tex)
- Customization (Nike ID)
- “Getting the job done” (Rolls Royce jet engines)
- Brand & status (luxury brands)
- Price (easyJet)
- Cost reduction (cloud computing)
- Risk reduction (warranties)
- Accessibility (NetJet)
- Convenience / Usability (Oxo)
- ...

3. Channels



- **Direct:** Sales force, Online
- **Indirect:** Partner stores, Wholesalers
- Channel Phases:
Awareness, Evaluation, Purchase, Delivery,
After sales

4. Customer Relationships



- Goals: Acquisition, Retention, Upselling
- Types of relationships:
 - (Dedicated) Personal assistance (private banking)
 - Self-service (online manuals)
 - Automated services
 - User communities
 - Co-creation (Amazon Reviews)



5. Revenue Streams

- Asset sale (Beats)
- Usage fee (UPS, Uber)
- Subscription fee (Netflix)
- Lending, Renting, Leasing (Zipcar)
- Licensing (media, tech patents)
- Brokerage fees (App stores)
- Advertising (Google, Facebook)

6. Key Resources



- Physical (equipment, plants)
- Intellectual (IP, patents, algorithms)
- Human (creative? Particular skills?)
- Financial

7. Key Activities



- Production – Making things
- Problem Solving – Services for customers (consulting, hospitals)
- Operating a platform or network (Google, Netflix, Yelp, Ericsson, Uber, AirBnb, ...)

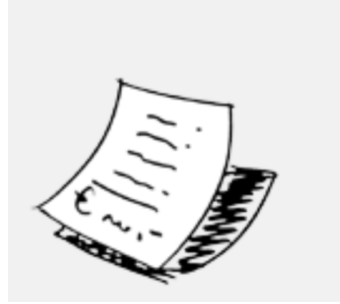
8. Key Partnerships



Motivations:










- Economies of scale / optimization of effort
 - Reduction of risk and uncertainty
 - Acquisition of resources/activities
-
- Examples: contract manufacturing, licensing content, user-generated content

9. Cost Structure



- Cost-driven vs. Value-driven ?
- Characteristics:
 - Fixed costs (salaries, rents, mfg facilities)
 - Variable costs (scale proportionally to volume of goods produced – BOM, shipping)
 - Economies of scale: avg cost/unit decreases as output increases
 - Economies of scope: cost sharing of different activities

The Business Model Canvas

<i>Key Partners</i> 	<i>Key Activities</i> 	<i>Value Proposition</i> 	<i>Customer Relationships</i> 	<i>Customer Segments</i> 
	<i>Key Resources</i> 		<i>Channels</i> 	
<i>Cost Structure</i> 			<i>Revenue Streams</i> 	

KP



record companies

OEMs

people

content & agreements

KA



hardware design

marketing

Apple brand

iPod hardware

iTunes software

VP



seamless music experience

CD



lovemark

switching costs

C

retail stores



Apple stores

apple.com

CS



mass market

C\$



people

manufacturing

marketing & sales

R\$



iTunes store

large hardware revenues

some music revenues

Crowdfunding & Business Plans

Crowdfunding
& 5-page Business Plan
(due Midnight, Wednesday
December 14th 2016)



Why Crowdfund? --- Indiegogo

- Validate market
- Capture data
- Interact with customers
- Identify early adopters
- Raise money

“Page one”

- Name of product + name of group members & roles
- Validate Market = Elevator speech of 10-25 words
- Capture data = How big is the market each year
- Interact with customers = Who did you interview?
- Identify early adopters (The “head bowling pin”)
 - Geoffrey Moore “Crossing the Chasm”
 - What is the very first market you will attack
 - If this works, then other markets just behind can be attacked
- Price = Estimated cost at Radio Shack or Target
- Cost = Cost of Goods (\$1 COGS = ~\$5 @ Kmart)










4 more pages, short business plan due Wednesday December 14th

- **Description of product** in more detail (0.5p)
- **Validate market** – who will use it (0.5p)
- **Capture data** on volume of market/year (0.5p)
- **Who are your first customers** and summarize the survey work with **early adopters** (0.5p)?
- **How much has it cost so far?** (1p)
 - Prototype + Electronic Materials = (class estimate)
 - Person hours working 15 weeks at 120K salary (includes benefits, medical etc) x Number of you in your group (3,4, or 5)
 - 15 Weeks, 4 hours class per week, and your lab times, meetings times
 - 1,000 sq. ft. @ \$2.50 per sq. ft.
 - Internet, utilities, umbrella insurance, laptops, printer, other IT services
- **The Pitch -- How will you raise money?** (1p – next slide)

How will you raise money (1 page)?

- “Your Pitch” = Show short term market success in the 2-5 year window
- Be clear about the market opportunity
- Be clear about volume and the scalability
 - **(Total Available Market)**
- Show you can be entrepreneurs and not just mad-inventors
- Or if not...describe the licensing opportunity...
- Consider the various SBIR programs (NSF etc)

TABLE 2.4 An Example of Magrab's Baseline Hypothetical Profit Model. (Reprinted with permission from *Integrated Product and Process Design* by E. B. Magrab. Copyright CRC Press, Boca Raton, Florida.)

		Year								
		j = 1	j = 2	j = 3	j = 4	j = 5	j = 6	j = 7	j = 8	j = 9
A	Sales price 			\$65.90	\$65.90	\$67.90	\$67.90	\$67.90	\$67.90	\$67.90
B	Number of units sold 			100,000	250,000	300,000	350,000	250,000	200,000	150,000
C	Net sales [=AB] 			\$6,590,000	\$16,475,000	\$20,370,000	\$23,765,000	\$16,975,000	\$13,580,000	\$10,185,000
D	Cumulative net sales [=SUM C(j)]			\$6,590,000	\$23,065,000	\$43,435,000	\$67,200,000	\$84,175,000	\$97,755,000	\$107,940,000
E	Unit cost (target) 			\$34.00	\$33.50	\$33.00	\$33.00	\$33.50	\$34.00	\$34.50
F	Cost of product sold  [=BE]			\$3,400,000	\$8,375,000	\$9,900,000	\$11,550,000	\$8,375,000	\$6,800,000	\$5,175,000
G	Gross margin (\$) [=C-F] 			\$3,190,000	\$8,100,000	\$10,470,000	\$12,215,000	\$8,600,000	\$6,780,000	\$5,010,000
H	% gross margin [=100G/C]			48.41%	49.17%	51.40%	51.40%	50.66%	49.93%	49.19%
I	Development cost	\$800,000	\$800,000	\$400,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
J	Marketing (13% net sales) [=0.13C]			\$856,700	\$2,141,750	\$2,648,100	\$3,089,450	\$2,206,750	\$1,765,400	\$1,324,050
K	Other (8% of net sales) [=0.08C]			\$527,200	\$1,318,000	\$1,629,600	\$1,901,200	\$1,358,000	\$1,086,400	\$814,800
L	Total operating expense  [=I+J+K]	\$800,000	\$800,000	\$1,783,900	\$3,509,750	\$4,327,700	\$5,040,650	\$3,614,750	\$2,901,800	\$2,188,850
M	Pretax profit [=G-L] 	(\$800,000)	(\$800,000)	\$1,406,100	\$4,590,250	\$6,142,300	\$7,174,350	\$4,985,250	\$3,878,200	\$2,821,150
N	% profit [=100M/C]			21.34%	27.86%	30.15%	30.19%	29.37%	28.56%	27.70%
O	Cumulative profit  [=SUM M(j)]	(\$800,000)	(\$1,600,000)	(\$193,900)	\$4,396,350	\$10,538,650	\$17,713,000	\$22,698,250	\$26,576,450	\$29,397,600

*Product enters market midyear.

This is an older chart.
As Steve Beck emphasized, the more modern
ratio of Item:A:to:Item E should likely be 5:to:1 price to COGS.

For table 2.4

What is the income stream from the product? The following definitions are often used:

- Sales price = estimated sales price of one unit from company to distributor (not retail)
- **Net sales** = individual sales price \times number of products sold
- Cumulative net sales = integrated net sales over several consecutive years

What are the costs of being in business and producing that particular product? The following definitions are often used:

- Unit cost = prime manufacturing and related manufacturing overhead costs of a single unit of product (see the cost of goods manufactured on the right of Figure 2.5)
- **Cost of the product** = unit cost \times number of products sold
- Development costs = conceptual and detailed design + launch + support
- Marketing costs = a percentage of net sales (Magrab, 1997, uses 13%)
- Other promotional and running costs = a percentage of net sales (Magrab, 1997, uses 8%)

What is the potential profit or loss? The following definitions are often used:

- **Gross margin** = net sales - cost of product
- Percentage gross margin = gross margin / net sales \times 100%
- Pretax profit = gross margin - development costs - marketing costs - other
- Cumulative profit = integrated profits (or losses) on a year-by-year basis

Table 2.4 has been reproduced from Magrab (1997) to show some specific figures. In that example, the first two years have no sales. However, the design and development costs are running up all the time showing a bottom line, *temporary loss of \$1.6 million*.

This particular illustration shows that by the year 2005, the product makes an impressive profit. But the risks of the first two to three years cannot be emphasized enough. And what if the customer does not like the product when it is released to the market? What if the development time is too long and another company launches a similar product first? Or a better product a few weeks later? The risks of a company are far too evident here.

Also it is useful to ask, Where will the 1.6 million come from? Obviously from a loan of some kind (new company) or a strategic investment (larger, existing company). At what effective interest rate? 8%? 10%? 12%? What other products might be launched by <www.start-up-company.com> that would make less money overall but involve a much lower risk than \$1.6 million? What other projects might a large existing company sponsor? Would another project be more central to the company mission?

These questions are really beyond the scope of the present book. *Economics* by Parkin (1990) or *Engineering Economy* by Thuesen, Fabrycky, and Thuesen (1971) have many chapters devoted to such issues as the economic analysis of alternatives.

A.4 OUTLINE OF A SHORT BUSINESS PLAN

A.4.1 Cover Page

- Name of the product and group members
- *Mission statement* (a succinct statement less than 25 words)
- A scenario of how the product will be used
- The "head bowling pin," or first market niche (Moore, 1995)
- How much it will cost when sold at Radio Shack/Sharper Image (10 words)
- How much this means for the final cost immediately after manufacturing (10 words) (Typically it is at least a 1 to 4 ratio between manufacture and retail.)

A.4.2 Additional 10 Pages

1. Description of the product and how it works (two pages).
2. Intended market: who will use it, and where will it be used (two pages)?
3. How much has the product cost so far to get it to the prototype (two pages)?
 - a. Material cost =
 - b. Prototype cost =
 - c. Person-hours of work assuming 80K annual salaries \times 4 or 5 in group =
 - d. Overhead costs assuming a 1,000-square-foot office space at rent of \$2.50 per square foot, electricity, phone, and so forth.
 - e. Three NT workstations, networking, CAD license, printer, and other peripherals
4. How much will it cost for first-year operations (two pages)?
 - a. Start-up costs and advertising
 - b. Equipment, legal fees, accounting services, patents, and the like
 - c. Payroll
5. How will the company work (two pages)?
 - a. Will it need inexpensive overseas manufacturing?
 - b. Who are the principals?
 - c. What are the markets?
 - d. Who is the competition? Do they have a "barrier to entry"? Will they steal the idea?
 - e. How long is the development time line?

A.4.3 Worst, Likely, and Best Case Scenarios (Three Tables + Text)

A key aspect of a business plan is the expected return over a five-year period. The information shown in Table 2.4 should be considered. Magrab (1997) provides additional information for a variety of scenarios—particularly those involving R&D overruns. A useful exercise is to construct three tables of this kind, with a rationalization for each: worst case scenario, most likely scenario, and best-case scenario.

A bank lender or venture capitalist will look at this information immediately after he or she understands the general mission statement for the product and the pedigree of the company founders.